

Appl. No. 10/663106  
Amdt. dated July 13, 2006  
Reply to Office Action of April 17, 2006

**Amendments to the Drawings:**

The attached sheets of drawings include changes to FIG. 7. The leader line for the reference designation "42" was amended. No other amendments were made to FIG. 7. The drawing sheet also includes FIGS. 8A and 8B. No amendments were made to these figures.

Attachment:        1 Replacement Sheet  
                         1 Annotated Sheet Showing Change

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Remarks/Arguments

1. Applicant thanks Examiner for the careful review of the present application, as evidenced by the Office Action of April 17, 2006. In that Office Action, Examiner objected to the drawings and rejected all pending claims 1 – 11.
2. **Objection / Amendments to the Drawings:** Examiner objected to the drawings for failing to show a “flow partition.” FIG. 7 was amended to properly indicate the “flow partition” recited in claim 8. The leader line for “42” inadvertently ended at element 50 A, rather than extending to the flow partition shown extending along the center portion of the transducer. Language supporting this amendment is found in paragraph [0045] of the Specification as originally filed. No amendments were made to the drawing itself. Applicant requests approval and entry of the amended drawing sheet and withdrawal of the objection.
3. **Amendments to the Claims:** Claim 1 was amended to recite a process liquid that is flowable through the expanded flow area and language added to more clearly identify the results of the structural elements of the device. The fact that the process liquid causes the oscillatory means to vibrate effectively converts the flow energy of the process liquid to an acoustic energy that works on the process liquid. Language was deleted from the preamble. Language supporting this amendment is found in paragraphs [0015] and [0043] of the Specification as originally filed. Unclear antecedence was corrected in Claim 6. New dependent claims 12 and 13 were added to further claim the specific results of the work done on the process liquid. Language supporting these claims is found in paragraphs [0021] – [0023] and [0026]. New method claim 14 was added to claim a method of effecting sonochemical processes on a process fluid. Language supporting this claim is found in paragraphs [0023], [0041],

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and [0042] of the Specification as originally filed. These amendments introduce no new subject matter.

4. **Rejection under U.S.C. § 112:** Examiner rejected claim 3 for insufficient antecedent basis. Examiner should have cited claim 6, rather than claim 3. Claim 6 has been amended to recite "said housing seal assembly" which was introduced earlier in the claim. Applicant requests that Examiner withdraw this rejection.

5. **Rejection under 35 U.S.C. § 102(b):** Examiner rejected claims 1 and 7 – 11 as being anticipated by **U.S. Patent 3,222,221 (Branson; 1959)**. **Branson** discloses an ultrasonic cleaning apparatus for cleaning particulate matter. The apparatus comprises a tank 10 containing a cleaning fluid 12, a vertically aligned chute 18, and a number of electro-acoustical transducers 22 arranged around the walls of the chute. The transducers provide the vibratory motion that generates the ultrasonic energy within the chute. Please note that the cleaning fluid is not the same as the "process fluid" or liquid recited in the claims of the present application. The cleaning fluid in **Branson** works as a cleaning agent on the particulate matter that is introduced into the apparatus. The process liquid of the present application is the substance that is to be worked on, whether it be for sanitizing, homogenizing, or effecting chemical reactions.

6. **Branson** neither discloses nor teaches a transducer in which process liquid flows through a housing, the process flow itself providing the source of energy for creating the vibratory motion of the oscillatory means. **Branson** does not disclose a means for cleaning a process liquid by ultrasonic means, that is, a substance that is itself the object of the cleansing operation, but rather, teaches using cavitation in liquid to clean particulate matter. **Branson** does not teach apparatus having "oscillatory means" that vibrate in response to a turbulent flow of the process liquid itself, but rather teaches

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applying ultrasonic energy to the chute by means of electro-acoustical or other types of transducers, which are driven by an external ultrasonic generator. **Branson**, col. 3, lines 65 – 75.

7. The present application discloses and claims a device for applying acoustic energy work to a process liquid by allowing the turbulent flow of the process liquid itself drive the oscillatory means, thereby converting the turbulent flow energy of the process liquid itself into acoustic energy which then works to sanitize, homogenize, or effect other change on the process liquid. The process liquid itself is the object of the cleansing operation, as well as the source of energy for driving the oscillatory means. This use of turbulent flow of the process liquid to generate the acoustic energy makes the device energy efficient and cost effective. It eliminates the need for external sources of energy to operate, requiring only a pressure differential between the inlet and outlet of the device.

8. Applicant submits that the invention claimed in currently presented claim 1 contains allowable subject matter and is clearly distinguishable from the cited prior art. Applicant therefore requests that Examiner withdraw the rejection based on **Branson**. Applicant further notes that claims 7 – 11 depend directly or indirectly from claim 1 and therefore contain the allowable subject matter of claim. Applicant requests that the rejection of these claims also be withdrawn.

9. **Rejection under 35 U.S.C. § 103(a):** Examiner rejected claims 2 – 6 as being unpatentable over **Branson**, and further in view of **U.S. Patent 4,428,757 (Hall; 1984)**. Hall discloses sonic energy fluid degassing apparatus having baffles and a seal cap. Claims 2 – 6 all depend directly or indirectly from claim 1, which contains allowable subject matter. Accordingly, claims 2 – 6 contain the allowable subject matter of claim

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1. Applicant respectfully requests that Examiner withdraw the rejection based on Hall.

10. Applicant has successfully traversed all rejections and submits that all claims currently pending include allowable subject matter. Applicant therefore requests that Examiner withdraw all rejections under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) and allow currently presented claims 1 - 14.

11. This paper is being filed within three months of the issue date of the Office Action. No additional late fees or other fees are due.

Respectfully submitted,



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Enclosed:  
Replacement drawing sheet  
Annotated drawing sheet

